What is claimed is:

1. A system for interconnecting an Internet protocol version 6 (IPv6) network and an Internet protocol version 4 (IPv4) network, comprising a plurality of IPv6 nodes, a plurality of IPv4 nodes, and a plurality of apparatuses for transmitting IP packets between the IPv6 nodes and the IPv4 nodes, wherein the apparatuses for transmitting IP packets share processing state information of the IP packets, using a predetermined message, to distribute their load of processing the IP packets.

2. The system of claim 1, wherein each apparatus for transmitting IP packets transmits a packet via network address translation-protocol translation (NAT-PT).

3. A system for interconnecting an IPv6 network and an IPv4 network, comprising a plurality of IPv6 nodes, a plurality of IPv4 nodes, and a plurality of NAT-PT apparatuses for transmitting IP packets between the IPv6 nodes and the IPv4 nodes, wherein the NAT-PT apparatuses share processing state information of the IP packets, using a predetermined message, to distribute their load of processing the IP packets.

4. The system of any one of claims 1 and 3, wherein the predetermined message is an Internet control message protocol version 6 (ICMPv6) redirect message defined in a neighbor discovery protocol (NDP).

5. The system of claim 4, wherein the ICMPv6 redirect message comprises:

a flag bit that indicates the processing state of a particular NAT-PT apparatus; and

a target address field which stores the address of another NAT-PT apparatus.

6. The system of claim 3, wherein a packet processing state of a particular NAT-PT apparatus is indicated by whether or not the current processing state of packets is equal to or greater than a predetermined threshold of the packet processing capacity of the particular NAT-PT apparatus, by observing a size of an IPv6-IPv4 address translation mapping table installed in the particular NAT-PT apparatus or a rate of use of the mapping table.

7. The system of claim 3, wherein a packet processing state of a particular NAT-PT apparatus is indicated by whether or not the current processing state of packets is equal to or greater than a predetermined threshold of the packet processing capacity of the particular NAT-PT apparatus, by observing a state of use of an IPv4 address pool installed in the particular NAT-PT apparatus.

8. An NAT-PT apparatus comprising:

a determination unit which receives an IPv6 packet and determines whether or not the received IPv6 packet is to be processed according to the current packet processing state of the NAT-PT apparatus;

an IPv4 address pool which stores IPv4 addresses with which the address of an IPv6 node which transmitted the IPv6 packet is mapped to an IPv4 address and then used;

a mapping table generation and storage unit which generates and stores a mapping table for mapping an IPv4 address corresponding to the address of the IPv6 node; and

an IP header translation unit which translates an IPv6 packet header into an IPv4 packet header.

9. The apparatus of claim 8, wherein the determination unit determines the current packet processing state of the NAT-PT apparatus by observing a size of the mapping table, a rate of use of the mapping table, or a state of use of the IPv4 address pool, and determines whether or not the received IPv6 packet is to be processed by the NAT-PT apparatus, according to whether or not the current packet processing state is equal to or greater than a predetermined threshold.

10. The apparatus of claim 8, wherein if it is determined that the NAT-PT apparatus is in a state of being incapable of processing the received IPv6 packet, the determination unit reports the state to the IPv6 node which transmitted the IPv6 packet.

11. The apparatus of claim 10, wherein reporting the state of the NAT-PT apparatus being incapable of processing packets to the IPv6 node which transmitted the IPv6 packet is performed by using an ICMPv6 redirect message.

12. The apparatus of claim 11, wherein the redirect message comprises:

a flag bit that indicates the state of the NAT-PT apparatus being incapable of processing packets; and

a target address field which stores an address of another NAT-PT apparatus.

13. The apparatus of claim 8, wherein the IP header translation unit translates an IP header by using a stateless IP/ICMP translation (SIIT) algorithm.

14. A method of interconnecting an IPv6 network and an IPv4 network in an IPv6-IPv4 interconnection system comprising a plurality of IPv6 nodes, a plurality of IPv4 nodes, and a plurality of NAT-PT apparatuses for transmitting IP packets between the IPv6 nodes and the IPv4 nodes, wherein the NAT-PT apparatuses share processing state information of the IP packets, using a predetermined message, to distribute their load of processing the IP packets.

15. The method of claim 14, wherein the predetermined message is an Internet control message protocol version 6 (ICMPv6) redirect message defined in a neighbor discovery protocol (NDP).

16. The method of claim 15, wherein the ICMPv6 redirect message comprises:

a flag bit that indicates the processing state of a particular NAT-PT apparatus; and

a target address field which stores the address of another NAT-PT apparatus.

17. The method of claim 14, wherein a packet processing state of a particular NAT-PT apparatus is indicated by whether or not the current processing state of packets is equal to or greater than a predetermined threshold of the packet processing capacity of the particular NAT-PT apparatus, by observing a size of an IPv6-IPv4 address translation mapping table installed in the particular NAT-PT apparatus or a rate of use of the mapping table.

18. The method of claim 14, wherein a packet processing state of a particular NAT-PT apparatus is indicated by whether or not the current processing state of packets is equal to or greater than a predetermined threshold of the packet processing capacity of the particular NAT-PT

apparatus, by observing a state of use of an IPv4 address pool installed in the particular NAT-PT apparatus.

19. An NAT-PT method performed in an NAT-PT apparatus, comprising:

(a) receiving an IPv6 packet and determining whether or not the received IPv6 packet is to be processed according to the current packet processing state of the NAT-PT apparatus;

(b) if the determination result indicates that the NAT-PT apparatus is capable of processing the received IPv6 packet, mapping an address of an IPv6 node which transmitted the IPv6 packet into an IPv4 address by using an IPv4 address pool which stores available IPv4 addresses; and

(c) translating a header of the received IPv6 packet into an IPv4 packet header.

20. The method of claim 19, wherein in step (a) the current packet processing state of the NAT-PT apparatus is determined by observing a size of the mapping table, a rate of use of the mapping table, or a state of use of the IPv4 address pool, and whether or not the received IPv6 packet can be processed by the NAT-PT apparatus is determined depending on whether the current packet processing state is equal to or greater than a predetermined threshold.

21. The method of claim 19, wherein in step (a), if it is determined that the NAT-PT apparatus is in a state of being incapable of processing the received IPv6 packet, the state is reported to the IPv6 node which transmitted the IPv6 packet.

22. The method of claim 21, wherein reporting the state of the NAT-PT apparatus being incapable of processing packets to the IPv6 node which transmitted the IPv6 packet is performed using an ICMPv6 redirect message.

23. The method of claim 22, wherein the redirect message comprises:

a flag bit that indicates the state of the NAT-PT apparatus being incapable of processing packets; and

a target address field which stores an address of another NAT-PT apparatus.

24. The method of claim 19, wherein in step (c) an IP header is translated using a stateless IP/ICMP translation (SIIT) algorithm.

25. A computer readable medium having embodied thereon a computer program for an interconnection method of interconnecting an IPv6 network and an IPv4 network in an IPv6-IPv4 interconnection system comprising a plurality of IPv6 nodes, a plurality of IPv4 nodes, and a plurality of NAT-PT apparatuses for transmitting IP packets between the IPv6 nodes

and the IPv4 nodes, wherein the NAT-PT apparatuses share processing state information of the IP packets, using a predetermined message, to distribute their load of processing the IP packets.

26. A computer readable medium having embodied thereon a computer program for an NAT-PT processing method performed in an NAT-PT apparatus, comprising:

(a) receiving an IPv6 packet and determining whether or not the received IPv6 packet is to be processed according to the current packet processing state of the NAT-PT apparatus;

(b) if the determination result indicates that the NAT-PT apparatus is capable of processing the received IPv6 packet, mapping an address of an IPv6 node which transmitted the IPv6 packet into an IPv4 address by using an IPv4 address pool which stores available IPv4 addresses; and

(c) translating a header of the received IPv6 packet into an IPv4 packet header.

27. A method of interconnecting an IPv6 network and an IPv4 network in a network comprising a plurality of IPv6 nodes, a plurality of IPv4 nodes, and at least one apparatus for transmitting IP packets between the IPv6 nodes and the IPv4 nodes, the method comprising:

(a) receiving a DNS message for searching for an IPv4 address of a destination domain name;

(b) transmitting the received DNS message to a DNSv4 server and receiving an IPv4 address of the destination domain name from the DNSv4 server;

(c) allocating a predetermined prefix to the received IPv4 address to translate the IPv4 address into an IPv6 address; and

(d) transmitting the translated IPv6 address to a corresponding IPv6 node.

28. The method of claim 27, further comprising transmitting a data packet to the IPv6 address as a destination address.

29. The method of claim 27, wherein the predetermined prefix is one of a plurality of prefixes allocated in a sequential order to the at least one apparatus for transmitting IP packets.

30. The method of claim 27, wherein the predetermined prefix is the prefix of an apparatus with the least load among the at least one apparatus for transmitting IP packets, the apparatus for transmitting IP packets with the least load being identified by using a predetermined message regarding information on the load of the at least one apparatus for transmitting IP packets.

31. The method of claim 30, wherein the predetermined message is created using a Code field of an ICMPv6 redirect message and a QType field of a reply message.

32. A system for interconnecting an IPv6 network and an IPv4 network in a network including a plurality of IPv6 nodes, a plurality of IPv4 nodes, and at least one apparatus for transmitting IP packets between the IPv6 nodes and the IPv4 nodes, the system comprising:

a DNS message receiving portion which receives a DNS message for searching for an IPv4 address of a destination domain address;

an IPv4 address receiving portion which transmits the received DNS message to a DNSv4 server and receives an IPv4 address of the destination domain name from the DNSv4 server;

an address translation portion which allocates a predetermined prefix to the received IPv4 address to translate the IPv4 address to an IPv6 address; and

a transmitting portion which transmits the translated IPv6 address to a corresponding IPv6 node.

33. The system of claim 32, wherein the predetermined prefix is one of a plurality of prefixes allocated in a sequential order to the at least one apparatus for transmitting IP packets.

34. The system of claim 32, wherein the predetermined prefix is the prefix of an apparatus with the least load among the at least one apparatus for transmitting IP packets, the apparatus for transmitting IP packets with the least load being identified by using a predetermined message regarding

information on the load of the at least one apparatus for transmitting IP packets.

35. The method of claim 34, wherein the predetermined message is created using a Code field of an ICMPv6 redirect message and a QType field of a reply message.